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Numerical sensitivity studies of dense overflows in the Drakkar framework

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The global 1/4° ocean/sea-ice DRAKKAR model is being used for dynamical studies of the ocean variability over the last 50 years. However we need to improve the mixing parameterisation of dense waters over the Greenland-Scotland Ridge. The impact of the Beckman & Döscher (1999)' s bottom boundary layer parameterisation, of lateral/bottom boundary conditions and of vertical resolution is evaluated in idealised DOME configurations at the typical DRAKKAR resolution (1/4° x 100m), with a reference to a high resolution (1/20° x 100m) DOME simulation. The effect of a advective/diffusive BBL parameterisation on tracers turns out to be weak; this motivated the implementation of a downslope diffusion of momentum in overflows. The bottom drag coefficient is found to affect the plume's angle of descent, following a theoretically-consistent relationship. These idealised simulations will help improve the representation of overflows in realistic DRAKKAR simulations.